

2004 Annual *Drinking Water Quality Report*

U.S. ARMY GARRISON REDSTONE ARSENAL, ALABAMA

We're pleased to provide you with this year's Annual Water Quality Report to keep you informed of the outstanding water quality and services we have delivered to you during the past year (2003). We have continued to meet our goal for another year in providing you with a safe and dependable supply of drinking water.

Our primary source of drinking water is the Tennessee River. Initially, water from the river is treated at Water Treatment Plant (WTP) No. 1. After initial treatment, final treatment is completed at WTP No. 3. Plant No. 3 supplies the majority of the drinking water required for Redstone Arsenal.

We also purchase a small amount of drinking water from Huntsville Utilities to supply Buildings 2592 (training facility), 6100 (field operations facility), and the Saddle Club (horse stable facilities). Huntsville Utilities uses two wells, two groundwater and two surface water treatment plants to provide potable water to their customers. The Tennessee River is used as the source water at Huntsville's two surface water treatment plants

A source-water assessment has been performed for our area to provide baseline data about the quality of source water before it is treated and distributed to our customers. This assessment identifies the origins of potential contaminants within our area and indicates the susceptibility of our water system to such contaminants. Based on data from this assessment, Redstone Arsenal's source water is at a low risk of being contaminated from the potential sites.

As reflected in this report, the drinking water produced by Redstone Arsenal (RSA) and Huntsville Utilities meet Federal and State drinking water standards. If you have any questions about this report, or concerning your water utility, please contact Eugene Daniels of Garrison Directorate of Environment and Safety at (256) 955-7591. We want you to be informed about your water utility.

Redstone Arsenal routinely monitors for constituents in your drinking water according to Federal and State laws. The test results tables show the results of our monitoring for the period of 01 January through 31 December 2003 or the most recent analysis period as required. To help your better understand the terms used in this report, we provided the following definitions:

- **Action Level (AL):** The concentration of a contaminant, which if exceeded, triggers treatment or other requirements that a water system must follow.
- **Detected Level:** The highest level detected of a contaminant for comparison against the acceptance levels for each parameter. These levels could be the highest single measurement, or an average of values depending on the contaminant.
- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
- **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **Range:** The lowest to the highest values for all samples tested for each contaminant. If only one sample is tested, the single result with no range is listed for that contaminant in the table.
- **Treatment Technique (TT):** A required process intended to eliminate or reduce the level of a contaminant in drinking water.
- **Non-Detects (ND):** Laboratory analysis indicates that the constituent is not present at the detection limit.
- **Parts per billion (ppb) or micrograms per liter ($\mu\text{g/l}$):** One part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.
- **Parts per million (ppm) or milligrams per liter (mg/l):** One part per million corresponds to one minute in two years or a single penny in \$10,000.
- **Parts per quadrillion (ppq) or picograms per liter (pg/l):** One part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in \$10,000,000,000,000.
- **Picocuries per liter (pCi/l):** Picocuries per liter is a measure of the radioactivity in water.

Health Effects Language

As you can see in the test result tables, we did not violate the Safe Drinking Water Act standards during 2003. We're proud to report that your drinking water meets or exceeds all Federal and State requirements. We have learned through monitoring and testing that some constituents have been detected in our drinking water. The EPA has determined that your water **IS SAFE** at these levels.

Please be aware that all drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's (EPA) Safe Drinking Water Hotline at 1-800-426-4791.

MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink two liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Some people may be more vulnerable to contaminants in drinking water than the general population. People who are immuno-compromised such as cancer patients undergoing chemotherapy, organ transplant recipients, people with HIV/AIDS or other immune system disorders, some elderly, and some infants can be particularly at risk from infections. People at risk should seek advice from their health care providers about drinking water from their public drinking water supply system. EPA/Centers for Disease Control and Prevention (CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- **Microbial contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- **Organic chemical contaminants, including synthetic and volatile organic chemicals**, which are byproducts of industrial processes and petroleum production. They can also come from gas stations, urban stormwater runoff, and septic systems.
- **Radioactive contaminants**, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Asbestos and Dioxin: Base on a study conducted by the Alabama Department of Environmental Management and with the approval of the United States Environmental Protection Agency, a statewide waiver for the monitoring of drinking water for asbestos and dioxin was issued. Thus, monitoring for these contaminants was not required.

We at Redstone Arsenal work around the clock to provide top quality water to every tap. We ask all of our customers to help protect our water sources, which are the heart of our community, our way of life, and our children's future. Thanks to each customer for the opportunity to serve you.

2003 (Or Latest) Test Results

Contaminant and unit of measure	Level Detected, Redstone Arsenal	Level Detected, Huntsville Utilities	MCLG	MCL
Bacteriological Contaminants				
Total Coliform Bacteria	0	0	0	Presence of coliform bacteria in 5% of monthly samples
Fecal coliform and <i>E. coli</i>	0	0	0	If a routine sample and repeat sample are total coliform positive, and one is also fecal coliform or <i>E. coli</i> positive
Radioactive Contaminants				
Beta/Photon emitters (mrem/yr)	2.13	N/D	0	4
Combined Radium (pCi/l)	N/D	N/D	0	5
Inorganic Contaminants				
Antimony (ppb)	N/D	N/D	6	6
Arsenic (ppb)	N/D	N/D	N/A	50
Asbestos (MFL)	[†] N/A	[†] N/A	7	7
Beryllium (ppb)	N/D	N/D	4	4
Cadmium (ppb)	N/D	N/D	5	5
Chromium (ppb)	N/D	N/D	100	100
Cyanide (ppb)	N/D	N/D	200	200
Mercury [inorganic] (ppb)	N/D	N/D	2	2
Selenium (ppb)	N/D	N/D	50	50
Thallium (ppb)	N/D	N/D	0.5	2
Synthetic Organic Contaminants Including Pesticides and Herbicides				
2,4-D (ppb)	N/D	N/D	70	70
2,4,5-TP [Silvex] (ppb)	N/D	N/D	50	50
Acrylamide (ppb)	N/D	N/D	0	TT
Alachlor (ppb)	N/D	N/D	0	2
Atrazine (ppb)	N/D	N/D	3	3
Benzo(a)pyrene [PAH] (ng/l)	N/D	N/D	0	200
Carbofuran (ppb)	N/D	N/D	40	40
Chlordane (ppb)	N/D	N/D	0	2
Dalapon (ppb)	N/D	N/D	200	200
Di (2-ethylhexyl) adipate (ppb)	N/D	N/D	400	400
Di (2-ethylhexyl) phthalates (ppb)	N/D	N/D	0	6
Dibromochloropropane [DBCP] (ng/l)	N/D	N/D	0	200
Dinoseb (ppb)	N/D	N/D	7	7
Dioxin [2,3,7,8-TCDD] (pg/l)	[†] N/A	[†] N/A	0	30
Diquat (ppb)	N/D	N/D	20	20
Endothall (ppb)	N/D	N/D	100	100
Endrin (ppb)	N/D	N/D	2	2
Epichlorohydrin (N/A)	^{††} N/A	^{††} N/A	0	TT
Ethylene dibromide (ng/l)	N/D	N/D	0	50
Glyphosate (ppb)	N/D	N/D	700	700
Heptachlor (ng/l)	N/D	N/D	0	400
Heptachlor epoxide (ng/l)	N/D	N/D	0	200
Hexachlorobenzene (ppb)	N/D	N/D	0	1
Hexa-Chlorocyclopentadiene (ppb)	N/D	N/D	50	50
Lindane (ng/l)	N/D	N/D	200	200
Methoxychlor (ppb)	N/D	N/D	40	40
Oxamyl [Vydate] (ppb)	N/D	N/D	200	200
PCBs [Polychlorinated biphenyls] (ng/l)	N/D	N/D	0	500
Pentachlorophenol (ppb)	N/D	N/D	0	1
Picloram (ppb)	N/D	N/D	500	500
Simazine (ppb)	N/D	N/D	4	4
Toxaphene (ppb)	N/D	N/D	0	3
Volatile Organic Contaminants				
Benzene (ppb)	N/D	N/D	0	5
Carbon tetrachloride (ppb)	N/D	N/D	0	5
O-Dichlorobenzene (ppb)	N/D	N/D	600	600
(Mono) Chlorobenzene (ppb)	N/D	N/D	100	100
P-Dichlorobenzene (ppb)	N/D	N/D	75	75
1,2-Dichloroethane (ppb)	N/D	N/D	0	5
1,1-Dichloroethylene (ppb)	N/D	N/D	7	7
cis-1,2-Dichloroethylene (ppb)	N/D	N/D	70	70
trans-1,2-Dichloroethylene (ppb)	N/D	N/D	100	100
1,2-Dichloropropane (ppb)	N/D	N/D	0	5
Ethylbenzene (ppb)	N/D	N/D	700	700
Styrene (ppb)	N/D	N/D	100	100
1,2,4-Trichlorobenzene (ppb)	N/D	N/D	70	70

Contaminant and unit of measure	Level Detected, Redstone Arsenal	Level Detected, Huntsville Utilities	MCLG	MCL
1,1,1-Trichloroethane (ppb)	N/D	N/D	200	200
1,1,2-Trichloroethane (ppb)	N/D	N/D	3	5
Toluene (ppm)	N/D	N/D	1	1
Vinyl Chloride (ppb)	N/D	N/D	0	2
Xylenes (ppm)	N/D	N/D	10	10

Table II Detected Contaminants – 2003 Test Results

Contaminant and unit of measure	Range	Level Detected, Redstone Arsenal	Range	Level Detected, Huntsville Utilities	MCLG/ MCL	Likely Source
Microbiological Contaminants						
Turbidity – Ground Water (NTU)	N/A	N/A	0.07 – 1.67	1.67	0/ 5.0/	Soil runoff
Turbidity - Surface Water (NTU) [Filtration Performance]	0.029 – 0.193	0.193	0.01 – 0.115	0.115	0/ TT = 5 NTU/	Soil runoff
Turbidity - Surface Water (NTU) [Sample Percentage]	N/A	100%	N/A	100%	0/ TT = percentage of sample <0.5 NTU	Soil runoff
Radioactive Contaminants						
Alpha emitters (pCi/l)	2.9 – 3.0	3.0	0 – 2.8	2.8	0/ 15	Erosion of natural deposits
Inorganic Contaminants						
Barium (ppm)	0.22– 0.24	0.24	.043 – 0.14	0.14	0/ 2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Copper (ppm) *	No. of Sites above action level - 0	0.084	No. of Sites above action level - 0	0.013	1.3/ AL=1.3	Corrosion of household plumbing systems; Erosion of natural deposits
Fluoride (ppm)	0.921 – 1.06	1.06	0.03 – 1.97	1.97	4/ 4	Water additive which promotes strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories
Lead (ppb) *	No. of Sites above action level - 0	3.4	No. of Sites above action level - 0	N/D	0/ AL=15/	Corrosion of household plumbing systems, Erosion of natural deposits
Nitrate (as Nitrogen) (ppm)	0.54 - 0.57	0.57	1.85 – 5.60	5.60	10/ 10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Nitrite (as Nitrogen) (ppm)	N/A	N/D	0 – 0.02	0.02	1/ 1	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Volatile Organic Contaminants						
Dichloromethane (ppb) (Methylene Chloride)	N/A	N/D	0 – 1.51	1.51	0/ 5	Discharge from pharmaceutical and chemical factories
HAAS [Total Haloacetic Acids] (ppb)	17.0 – 57.6	36.0	0 – 96.8	20.7	N/A/ 60	By-product of drinking water chlorination
Tetrachloroethylene (ppb)	N/A	N/D	0 – 0.60	0.60	0/ 5	Leaching from PVC pipes; discharge from factories and dry cleaners
Trichloroethylene (ppb)	N/A	N/D	0 – 0.51	0.51	0/ 5	Discharge from metal degreasing sites and other factories
TTHM [Total Trihalomethanes] (ppb)	37.1 – 48.5	48.5	0 – 70.06	70.06	N/A/ 100	By-product of drinking water chlorination
Secondary Contaminants						
“T” Alkalinity (ppm)	65 - 74	69.5	53 - 160	151	N/A	Water distribution system
Aluminum (ppb)	NA	N/D	0 - 41	16	200	Water distribution system
Calcium Carbonate (ppm)	23.98	23.98	72 - 160	151	N/A	Water distribution system
Chlorine (ppm)	1.61 – 1.79	1.71	1.2 – 3.1	2.1	4/ 4	Water Chlorination
Conductivity um/hos cm ³	160 - 198	179	165 - 400	295	N/A	Water distribution system
Hardness (ppm)	79.9 – 82.4	81	74 - 176	125	N/A	Water distribution system
Iron (ppb)	130	130	0 - 70	30	300	Water distribution system
Magnesium (ppm)	4.85 – 5.08	4.96	2 - 24	11	N/A	Water distribution system
Contaminant and unit of measure	Range	Level Detected, Redstone	Range	Level Detected, Huntsville	MCL	Likely Source
Manganese (ppb)	NA	N/D	0 – 23	3	50	Water distribution system
pH	7.53 – 7.95	7.74	6.55 – 8.66	7.85	6.0-8.5	Water distribution system
Sodium (ppm)	10.85 – 12.50	11.49	2.3 – 4.2	3.15	N/A	Water distribution system

Sulfates (ppm)	21.4 – 22.1	22.8	12 – 58	20	250	Water distribution system
Total Organic Carbon (ppm)	0.6 – 1.8	1.2	1.3 – 2.3	1.8	N/A	Naturally present in the environment
Zinc (ppb)	20 - 30	25	14 – 240	127	5000	Water distribution system

Unregulated Contaminants

Bromodichloromethane (ppb)	5.13 - 14	10.09	---	---	NA	Chemical facilities, waste sites, or drinking water enters the atmosphere as a gas BDCM
Dibromochloromethane (ppb)	0.62 – 2.82	1.90	---	---	NA	Water distribution system

Table III Undetected, Unregulated Contaminants

Aldicarb	Carbaryl	1,1-Dichloropropene	Propachlor
Aldicarb sulfone	Chloroethane	1,3-Dichloropropene	n-Propylbenzene
Aldicarb sulfoxide	Chloromethane	Dieldrin	Sulfate
Aldrin	o-Chlorotoluene	Fluorotrichloromethane	1,1,1,2-Tetrachloroethane
Bromobenzene	p-Chlorotoluene	Hexachlorobutadiene	1,1,2,2-Tetrachloroethane
Bromochloromethane	Dibromomethane	3-Hydroxycarbofuran	1,2,3-Trichlorobenzene
Bromoform (ppb)	Dicamba	Isopropylbenzene	1,2,3-Trichloropropane
Bromomethane (methyl bromide)	m-Dichlorobenzene	p-Isopropyltoluene	1,2,4-Trimethylbenzene
Butachlor	Dichlorodifluoromethane	Methomyl	1,3,5-Trimethylbenzene
sec-Butylbenzene	1,1-Dichloroethane	Metolachlor	
n-Butylbenzene	2,2-Dichloropropane	Metribuzin	
tert-Butylbenzene	1,3-Dichloropropane	Naphthalene	

* Turbidity is a measure of the cloudiness of the water. We monitor it to evaluate the effectiveness of our filtration system.

** The EPA considers 50 pCi/l to be the level of concern for beta particles.

[†] Based on a study conducted by ADEM with the approval of the EPA, a statewide waiver for the monitoring of asbestos and dioxin was issued.

^{††} There are currently no acceptable means of detecting epichlorohydrin in drinking water. In this case, EPA is requiring water suppliers to use a special treatment technique to control its amount in water.

Redstone Arsenal's Drinking Water Sources

